

SECTION III.—FORECASTS.

FORECASTS AND WARNINGS FOR NOVEMBER, 1915.

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The forecasts and warnings for November were conditioned upon the appearance and movement of 12 highs and 13 lows, as graphically portrayed on Charts II and III of this REVIEW.

*Normal pressure change, October to November.*¹—Normal atmospheric pressure in the Northern Hemisphere diminishes during the period August to November over the two centers of low pressure in the North Atlantic and North Pacific, respectively. Beginning in September, however, and continuing until December the pressure increases 0.10 to 0.15 inch over large parts of the continental areas North America and Asia, this increase being most marked in Central Asia. Over the greater part of the United States, proper, pressure normally increases somewhat from October to November.

Pressure in Alaska and other centers of action.—During the current month pressure was uniformly below the normal in Alaska, the greatest negative departure being at Eagle, viz, -0.24 inch. A natural inference drawn from the pressure distribution over the Aleutians and Alaska is that when pressure is uniformly low, as it was during the current month, individual lows would develop at rather frequent intervals and pass southeastward to the northern boundary of the United States and thence eastward to the Atlantic, viz, the Great Lakes and the St. Lawrence Valley. This inference proved to be only partially correct, since the number of lows passing eastward along the northern boundary was less than usual in November, as may be seen by an inspection of Chart III of this REVIEW. On the other hand, there was a marked tendency for lows to pass southeastward, crossing the Rocky Mountains in Wyoming and Colorado and soon thereafter curving to the northeast and passing beyond the field of observation over the Great Lakes.

To what extent, if any, this movement was conditioned upon the prevailing pressure distribution over Iceland can not be stated, since no observations from that region are at present available. Pressure at the Azores, however, was below the normal, while over the western part of the Atlantic, as at Bermuda, pressure was slightly above the normal.

Movements of highs.—The movement of highs was somewhat abnormal for the month, since all but two appeared to be of Pacific origin. These two exceptions are highs Nos. III and VII of Chart II. High No. VII exemplifies in a marked degree the tendency to increasing pressure in the central portion that is noted occasionally in highs which move into the Lake region from the north or west in the spring. Pressure in the center of this high continued to increase slightly until it had passed off to sea over the Massachusetts coast. High No. III showed an increase in central pressure while passing eastward from the northern Plateau region on the 8th and 9th. This increase in pressure, however, was also observed practi-

cally simultaneously over Alaska and the Canadian Northwest. The simultaneity of the rise suggests an important exception to the generally accepted rule that the phenomena of rising and falling pressure, as displayed by the allobars, progress uniformly over the earth's surface from one point to another.

The storm winds of the 19-20th, Low No. VI.—Low No. VI advanced rapidly from the Canadian Northwest on the night of the 15th to northwestern Colorado, in 24 hours; then at a much reduced speed to Oklahoma, in the succeeding 24 hours; recurving during the night of the 17-18th to the northeast; at the same time there was developed a second center of low pressure in the primary low. This second center, on the morning of the 18th, was located over southeastern Louisiana, while the center of the primary low was over northern Arkansas. During the 18th pressure in the southern extension of the primary fell at a remarkably rapid rate and the attendant conditions gave every indication of the development of a severe storm. At the night observation of the 18th the center of the primary was over Illinois, while the secondary center had reached Columbia, S. C., with a fall of pressure of 0.87 inch in 12 hours, and high east to southeast winds along the coast from Jacksonville to Hatteras, notice of which had been previously given. According to all precedents this secondary center should have followed the coast line to southern New England but, on the contrary, it evidently merged with the primary low which on the morning of the 19th was central over Michigan, with lowest pressure 28.98 inches. Nevertheless, fresh southeast gales prevailed along the Middle Atlantic coast on the 19th, the maximum recorded velocity being 72 miles per hour at New York City. Fresh to strong gales were also experienced over the Great Lakes, particularly on Lake Erie, from the afternoon of the 19th until the afternoon of the 20th. High winds prevailed in the Lake region also on the 8th, 11th, and 29th, in connection with lows Nos. III, IV, and XII.

Low No. II, after passing off to sea over the Massachusetts coast on the 5th, apparently increased considerably in energy during that day, causing northeast gales at Nantucket, which continued for a part of the 6th. There were several periods of high offshore winds along the New England and Middle Atlantic coast, notably on the 10th, 15th, 16th, and 21st. On the 24th and 25th fairly strong northerly winds prevailed, due to a depression over the Atlantic between Bermuda and Sable Island.

Frosts.—The southeastward movement of high No. VI over Texas, the Gulf and the South Atlantic States on the 15th and 16th brought general frost to those regions; the frost along the coast districts was generally light; in the interior heavy to killing. A second general frost period ensued in the Gulf and South Atlantic States on the 30th, in connection with high No. XII.

DISTRICT WARNINGS DURING NOVEMBER.

Chicago district.—No warnings of consequence were issued during the month, as the period was quite uneventful, aside from temperature above the average.—H. J. Cox, Professor of Meteorology.

¹ Based upon International Greenwich noon observations, 1878-1887, as published in Report of Chief Signal Officer, 1891, p. 747.

Denver district.—On the 24th, 8 p. m., cold wave warnings were issued for eastern Colorado. Marked falls in temperature were general, the warning being fully justified in the northeastern counties.

On the 27th, 8 p. m., cold wave warnings were issued for southeastern New Mexico. This warning was justified.—*F. H. Brandenburg, District Forecaster.*

New Orleans district.—The first cold wave of the season occurred in northwestern Louisiana and in eastern and southern Texas, except at immediate coast stations on November 15. Warnings for the cold wave were issued the morning of the 14th.

Freezing temperatures occurred on several dates and warnings were issued well in advance in each case.

No general storm occurred on the West Gulf coast during the month.—*I. M. Cline, District Forecaster.*

Portland district.—The weather during the last half of November was unusually stormy and storm warnings were issued on nine different days. Those issued on

the 15th, 21st–22d, and 24th–25th were the most important.

While warnings were flying, the Chilean ship *Carel Napu* was wrecked on the south shore of Vancouver Island at 1 p. m. November 25. The crew consisted of 23 persons, of whom 5 were saved and 18 were lost.—*E. A. Beals, District Forecaster.*

San Francisco district.—The month was exceptionally free from storms of even moderate severity and the precipitation reported was in the form of showers; generally scattered and of short duration.

Storm warnings were displayed on the 8th from San Francisco to Eureka, and on the 15th from Mendocino to Eureka, when moderately strong winds occurred off the coast.

Quite heavy frosts occurred in northern California on the 9th, and over the entire State from the 10th to 14th and on the 27th. These frosts were forecast, and but slight damage occurred.—*G. H. Willson, District Forecaster.*